

REMARKS

In view of the above amendments and the following remarks, reconsideration of the rejections and further examination are requested. Upon entry of this amendment, claims 9-11 and 14-16 are amended, claims 12 and 13 are canceled and claims 17-24 are added, leaving claims 9-11 and 14-24 pending with claims 9 and 17 being independent. No new matter has been added.

Rejections Under 35 U.S.C. §112, second paragraph

Claims 10-13, 15 and 16 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

Claims 10, 11, 15 and 16 have been amended to overcome this rejection. Claims 12 and 13 have been cancelled.

Rejections Under 35 U.S.C. §102(b)

Claims 9-11, 15 and 16 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Furuya et al. (U.S. Patent No. 6,260,367) (hereinafter “Furuya”).

Amended independent claim 9 recites, among other things, a compression refrigeration system including a stream splitting arrangement configured to generate a split stream flow to control superheating of compressor suction gas and further configured to expand the split stream flow from the high pressure side of a heat rejector through a second expansion unit directly to a low pressure side of the heat absorber after heating the compressor suction gas.

Such a structure enables superheating to be obtained even though the evaporation temperature may be high. Further, by controlling the superheating in this way, the coefficient of performance of the system can be optimized. The heating of the water, for instance in a heat pump water heating application, closely follows the cooling of the CO₂, thereby reducing the heat exchanger heat losses.

Applicants submit that Furuya does not disclose or render obvious such a system. Specifically, Furuya does not disclose a stream splitting arrangement configured to generate a split stream flow and expand the split stream flow from the high pressure side of the heat rejector

through a second expansion unit directly to the heat absorber low pressure side after heating the compressor suction gas. Furuya uses a bypass passage from the receiver (7) provided in parallel with the internal heat exchanger (3b) on the low pressure side. There is simply no stream splitting arrangement from the heat rejector at a high pressure side that controls the superheating of compressor suction gas and improves the system efficiency wherein the split stream flow is expanded from the high pressure side through a second expansion unit directly to the heat absorber low pressure side. In fact, in the obviousness rejection of claims 12 and 13 on page 5, item 8 of the office action, the Examiner states that “Furuya et al. does not specifically disclose the system wherein the split stream from the heat rejector is used for compressor suction gas superheating; wherein the split stream from the high pressure side is expanded directly to heat absorber pressure after suction gas heating.”

Therefore, Applicants submit that independent claim 9 is allowable over the Furuya patent.

Rejections Under 35 U.S.C. §103(a)

Claims 12-14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Furuya in view of Burk et al. (U.S. 2001/0052228) (hereinafter “Burk”).

Independent claim 9 now generally recites the subject matter of dependent claims 12 and 13; therefore, independent claim 9 will be addressed with respect to the combination of Furuya and Burke.

Furuya fails to disclose or render obvious all of the elements of independent claim 9, as discussed above. On page 5, item 8 of the office action, the Examiner cites Burk as teaching that a split stream (5 and 5a) from the heat rejector (3) is used for compressor (1) suction gas superheating; wherein the split stream from the high pressure side is expanded (7 and paragraph [0026]) directly down to heat absorber pressure after suction gas heating.

Applicants respectfully disagree and submit that Burk fails to overcome the deficiencies of Furuya. Specifically, Burk does not disclose or render obvious a stream splitting arrangement configured to generate a split stream flow and expand to the split stream flow from the high pressure side of the heat rejector through a second expansion unit directly to the low pressure

side of the heat absorber after heating the compressor suction gas, as recited in claim 9. The elements that the Examiner cites for the split stream from the high pressure side 5 and 5a clearly do not expand a split stream flow directly to the heat absorber low pressure side after suction gas heating through a second expansion unit. As specifically taught in paragraph [0026] of Burke, “the motor vehicle air-conditioning system ... contains a refrigerant circuit with a compressor 1 followed on the refrigerant high-pressure side by two parallel condensers or gas coolers 2, 3, each in their own branch 4, 5. These line branches are combined again *upstream* of the expansion member 7.” (Emphasis added). This paragraph continues by teaching that in an alternative embodiment, “line branches 4, 5 [can] be combined downstream of the inner heat exchanger 6, at point P’.... In this embodiment, only the line branch 4 ... is led through the inner heat exchanger 6, while the other line branch 5...bypasses the inner heat exchanger 6, as illustrated in FIG. 2 by the dashed line segment 5a.” Applicants submits that while line branch 5 may bypass heat exchanger 6 via dashed line segment 5a, dashed line segment 5a still combines with line branch 4 *upstream* of the expansion member 7. Therefore, in the embodiment cited by the Examiner, and in each and every embodiment taught in Burk, the separate branches combine on the high pressure side and not the directly to the heat absorber low pressure side, as recited in independent claim 9.

Furthermore, since neither reference discloses this element, the combination of the references fails to disclose this element. Thus, Applicants submit that independent claim 1 and its dependent claims are allowable over the cited prior.

New Claims 17-24

New independent claim 17 is allowable for substantially similar reasons to those discussed above for independent claim 9. Specifically, the cited prior art alone or in combination fails to disclose or render obvious a method for the operation of a compression refrigeration system, comprising generating a split stream flow through a stream splitting arrangement; controlling superheating of compressor suction gas via the split stream flow; and expanding the split stream flow through a second expansion unit after heating the compressor suction gas.

Therefore, Applicants submit that independent claim 17 and its dependent claims 18-22

are allowable over the cited prior art. Additionally, claims 23 and 24 are allowable, since they are dependent from independent claim 9.

Conclusion


In view of the foregoing amendments and remarks, all of the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action are respectfully solicited.

Should the Examiner believe there are any remaining issues that must be resolved before this application can be passed to issue, it is respectfully requested that the Examiner contact the undersigned by telephone in order to resolve such issues.

Respectfully submitted,

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